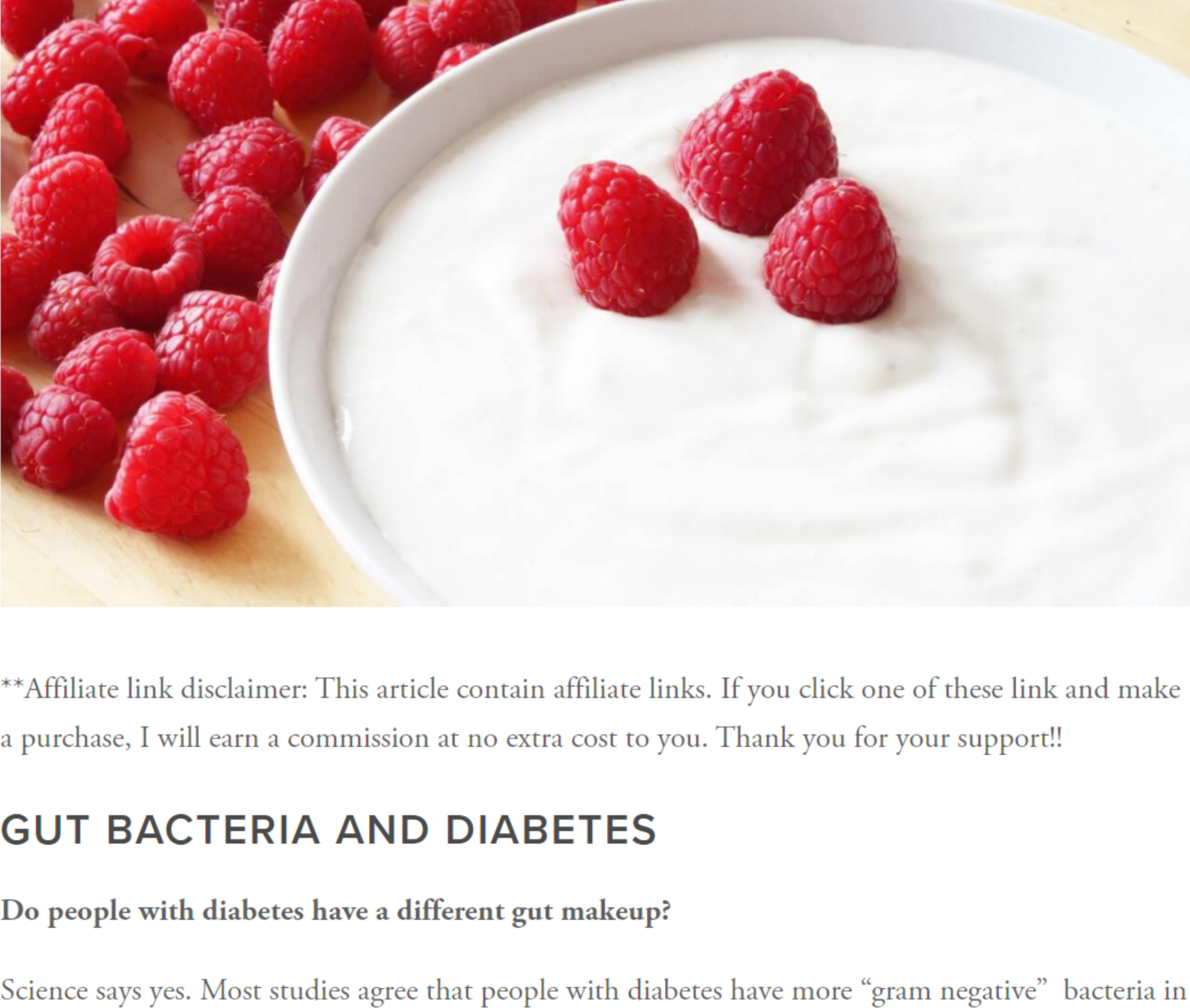


## Type 2 Diabetes and Probiotics: What Does Science Say?

Probiotics are the teeny tiny bacteria that control a lot more in our bodies than we ever knew! Trillions of these guys are currently living inside of your digestive tract and impact things like blood sugar, insulin, insulin resistance, cholesterol, and many other things associated with diabetes. These little bugs are even referred to as a separate organ because they influence SO MUCH in our bodies.

There is a lot that is unknown about our gut bacteria (aka colon comrades/fecal friends/ bowel buddies... too far?) but research is beginning to show how we can improve our gut health by including more of these healthy creatures in our diet. The trick is making sure we are getting the right bacteria into our gut!



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### GUT BACTERIA AND DIABETES

#### Do people with diabetes have a different gut makeup?

Science says yes. Most studies agree that people with diabetes have more “gram negative” bacteria in their digestive tract (1). These particular bacteria are known to increase insulin resistance, increase glucose (sugar) levels in the blood, promote inflammation, and increase fat storage (1).

#### What hurts our gut bacteria?

Things such as excessive fat intake, low fiber intake, excessive antibiotic use, and over cleanliness are a few ways our gut bacteria can be negatively affected (2).

#### What came first? The chicken or the egg?

It is hard to determine if diabetes causes altered gut bacteria or if the altered gut bacteria contributes to the development of diabetes.

One interesting study showed how gut bacteria from a diabetic rat was able to induce insulin resistance in a non-diabetic rat through a fecal transplant (3). This may suggest that altered gut bacteria contribute to the development of diabetes.

While science is pointing towards the idea that the altered gut bacteria comes before diabetes, more studies will need to be done before we find the true answer (3).

#### Can I change my gut bacteria?

Yes! Keep reading to learn how to create a happy environment and how to add more of the good bacteria to your gut :-)

### PREBIOTICS AND DIABETES

Before we jump into everything probiotics, let me introduce you to their best friend, prebiotic. Prebiotics can be considered the food of probiotics. Probiotics love to feast on foods that contain indigestible fibers that make their way through the small intestine and into the colon.

For example, if probiotics were plants, prebiotics would be the fertilizer and water for the plant. Without prebiotics, probiotics have a hard time surviving.

#### How can prebiotics help people with diabetes?

Prebiotics help increase the number of beneficial probiotics and therefore improve our health!

Studies show that an intake of 5-8g/day can significantly improve gut bacteria (4). Start slowly when first introducing more prebiotics into your diet as to avoid any intestinal discomfort (aka gas!).

#### Where are prebiotics found?

Prebiotic-rich foods include leek, asparagus, chicory, Jerusalem artichoke, garlic, artichoke, onion, wheat, banana, oats, beans, and soybean (4).

Prebiotic can also be found in supplement form. A good prebiotic supplement will include Xylooligosaccharides or a mixture of inulin/xylo-oligosaccharides (5). These are just fancy words for fiber.

**Click here for a great prebiotic supplement** that includes both of these fibers. And as always, make sure to consult with your doctor before adding supplements to your diet!

## PREBIOTIC RICH VEGETABLES



**1 LEEK**



**2 ASPARAGUS**



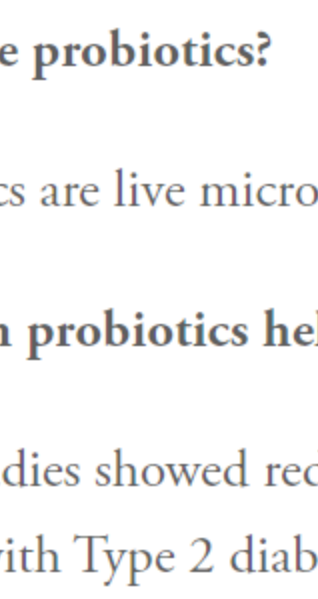
**3 CHICORY LETTUCE**



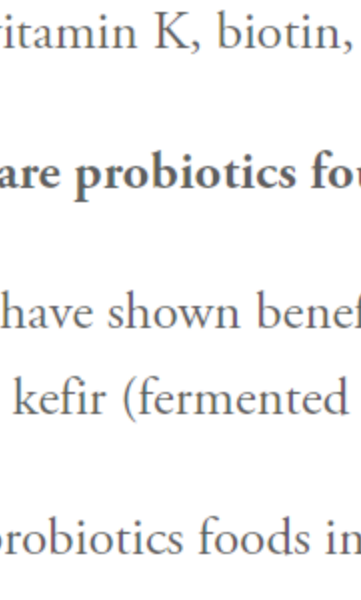
**4 GARLIC**



**5 ARTICHOKE**



**6 ONION**



**7 SOY BEAN**



*Laurel Ann Nutrition*

### PROBIOTICS FOR DIABETICS

#### What are probiotics?

Probiotics are live microorganisms (typically bacteria) that live in our gut.

#### How can probiotics help people with diabetes?

Most studies showed reduced blood glucose (sugar), hemoglobin A1c levels, and inflammation in people with Type 2 diabetes (3). A few studies also indicated improvements in insulin resistance (3). Woo!

Probiotics can also lead to weight loss by consuming some of our calories. These bacteria only consume small amounts of our energy (less than 1%), however, over time this may lead to changes in body weight (2).

Oh and one more! Probiotics in the gut produce and deliver vitamins to the host (that's us!) such as folate, vitamin K, biotin, riboflavin, cobalamin (B12), and possibly other B vitamins (6).

#### Where are probiotics found?

Studies have shown beneficial effects of yogurt, cheese (such as Swiss, Gouda, blue, and cottage cheese), kefir (fermented milk), and kimchee in improving diabetic markers. (7, 8).

Other probiotics foods include sauerkraut, miso, tempeh, and kombucha but have not been studied extensively or have conflicting results for improving diabetes-related complications (9, 10).

**Supplements** have also been shown to improve HbA1c, fasting blood glucose (sugar), and fasting insulin levels (1). The probiotic strains found most effective in the studies included Lactobacillus strains and Bifidobacterium strains (1).

## DIABETES AND PROBIOTICS

Studies show how these foods may improve blood sugar, insulin, and A1c levels in people with type 2 diabetes



**1 YOGURT**

Yogurt is made from fermented milk by added bacteria



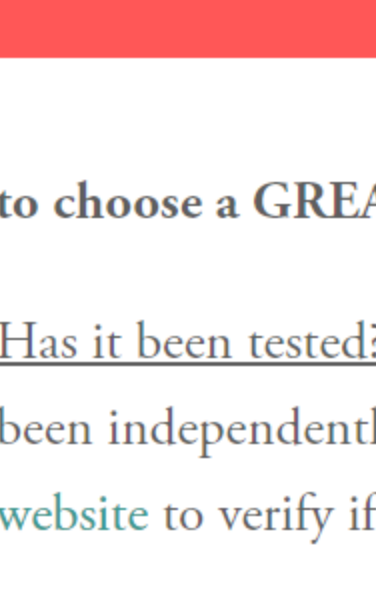
**2 KIMCHEE**

Fermented Korean Cabbage



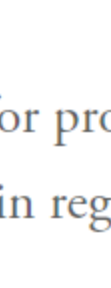
**3 KEFIR**

Fermented milk drink with a slightly sour/yogurt taste



**4 CHEESE**

Swiss, Gouda, blue, and cottage cheese



*Laurel Ann Nutrition*

#### How to choose a GREAT probiotic supplement:

- **Has it been tested?** When searching for a good supplement it is a great idea to make sure it has been thoroughly tested to verify its makeup. You can check out a website such as labdoor's website to verify if a supplement has been tested.
- **Is it a controlled release form?** Make sure all of your probiotic supplements are controlled released to ensure these bacteria make it to your gut alive!
- **Does it contain multiple strains?** It is also important to find a probiotic that contains multiple strains, especially the Lactobacillus and Bifidobacterium strains (1).

Here is **prebiotic + probiotic supplement** that meets these criteria :-)

There is no established dose for probiotics at this time. Make sure to consult with your doctor before taking new supplements and in regards to the amount of the supplement to take.

#### Who should be cautious before consuming probiotics?

- Immunocompromised individuals should be cautious before taking a probiotic and should always discuss it with their doctors first (1)
- Individuals with severe acute pancreatitis should not take probiotics (11)
- It is also not recommended in individuals who have had recent surgery, venous catheter, or a recent prolonged hospital stay (11)

#### Final Thoughts

Will probiotics cure Diabetes? No. But studies have been shown they may improve HbA1c levels, fasting insulin, and fasting blood glucose levels.

It is unclear whether the benefits of probiotics are lasting, but most agree that daily intake is needed to continually see the benefits we discussed.

So, become better friends with those bacteria living in your gut. While they don't pay rent for the space they take up, they do provide a long list of benefits to us and our health :-)

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